

Patent Laid-Open Publication No. 2-14194

Specification

1. Name of Invention

An integrated circuit card and its manufacture method

2. Claim

1. It is Characterized by Uniting with Mounting Board (2) and Forming Card Machine Material (4) Which Becomes One Side of Mounting Board (2) in which Electronic Products were Carried from Liquid Crystal Resin (3) through Thermoplastic Adhesives (5) by the Ejection Fabricating Method.

Integrated circuit card.

2. Integrated circuit card of claim 1 publication to which liquid crystal resin (3) makes basic structure copolymer of p-hydroxy benzoic acid and polyethylene tele lid rate.

3. Manufacture method of integrated circuit card characterized by carrying out ejection fabrication of liquid crystal resin (3), for forming card machine material (4) in metallic mold (1), and uniting with mounting board (2) after applying thermoplastic adhesives (5) to field which touches liquid crystal resin (3) of mounting board (2) in which electronic products were carried and installing this mounting board (2) in one side in metallic mold (1).

3. Detailed Explanation of Invention

[Field of the Invention]

This invention relates to the integrated circuit card which curl does not produce, and its manufacture method, without damaging the electronic products carried in the mounting board at the time of fabrication.

[The conventional technology]

With an integrated circuit card, a credit card, a bank card, etc. in a magnetic stripe-like record layer as what is replaced with the so-called magnetic card with which magnetic record of an owner code, the specific code information, etc. was carried out. What carried out the internal organs of the IC module which consisted of a CPU which outputs the discernment information which operated on the main part of a card according to the human power signal from the outside, and was beforehand included in it, RAM, etc., Or there is a thing used as external storages, such as file management, and data management, game software, instead of a floppy disk or a thing package-ized by mounting IC tip in a print circuit board as a program card.

the thing which the appearance is a card-like and exposed the point of contact, or electromagnetism -- there is also a thing of the non-point of contact which outputs and inputs data by guidance etc

Such a manufacture method of an integrated circuit card was a method of containing the IC module 33 to the recess 32 of the card board 31, pasting up the insulated board 34 on the card board 31 with adhesives, and wearing front reverse side both sides of this card board 31 with the coating film 35, as shown in Fig. 6.

By this method, in order to maintain airtightness and to prevent running out of IC module, it is necessary to finish the size of a recess 32 of a card board, the IC module 33, and the insulated board 34 with very sufficient accuracy.

However, since the manufacture is very difficult, it has usually filled up a gap portion with the IC module 33 of the recess 32 with adhesives.

However, it was not that which may be by no means satisfactory also durability and in respect of airtightness while it is very difficult to elapse and overflow and for it to manage in a proper quantity that play will arise to the IC module 33, airtightness will be come bad, or IC module will jump out if there are too few adhesives with which it is filled up, and there are many adhesives.

As a method of solving such a problem, as shown in Fig. 8 in recent years, there is the manufacture method of using the ejection fabricating method.

the printed circuit board 37 in which parts, such as the IC module 40 and IC, were carried -- vacuum suction and a metallic mold -- it fixes in a metallic mold 36 by the guide pin 39 prepared inside, and the method of subsequently to in a metallic mold 36 ejecting and card-izing thermoplastic resin is devised

[Object of the Invention]

However, it has the faults also with this following ejection fabricating method.

That is, it is that curl occurs in an integrated circuit card according to the difference of the rate of contraction with the thermoplastic resin by which ejection fabrication was carried out with IC module or the printed circuit board.

Then, as it is shown in Fig. 7 as an integrated circuit card to prevent that curl arises, two mounting boards 37 are prepared and there are some which carried out ejection fabrication of the resin between them (refer to Provisional Publication No. No. 222713 [61 to]).

However, the integrated circuit card of such composition needs to connect both of substrates electrically, and in case it ejects resin, it tends to sever them.

Moreover, since the number of sheets of a substrate increased, the thickness of an integrated circuit card became large and thin-shaping was difficult only for the part.

Furthermore, there was a problem of the electronic products carried in the mounting board by the pressure of molten resin at the time of fabrication being damaged.

It is in the purpose of this invention offering an integrated circuit card with high reliability strong against the manufacture method of an integrated circuit card and external stress which solve the above problems, can carry out ejection fabrication, without damaging the electronic products carried in the mounting board, and do not produce curl.

[Means for solving a subject]

This invention was constituted as follows, in order to attain the above purpose.

That is, the integrated circuit card of this invention was constituted so that it might unite with a mounting board and the card machine material which becomes one side of the mounting board in which electronic products were carried from liquid crystal resin through thermoplastic adhesives might be formed by the ejection fabricating method.

moreover, the field where the manufacture method of the integrated circuit card this invention touches the liquid crystal resin of the mounting board in which electronic products were carried -- the thermoplastic adhesives -- applying -- this mounting board -- a metallic mold -- the metallic mold after installing in inner one side -- it constituted so that ejection fabrication of the liquid crystal machine material might be carried out, card machine material might be formed inside and it might unite with a mounting board

This invention is explained still in detail, referring to a drawing.

Fig. 1 is a sectional view showing one case of the operation of the manufacture method of the integrated circuit card of this invention.

For a metallic mold and 2, as for liquid crystal resin and 4, a mounting board and 3 are [1 / card machine material and 5] thermoplastic adhesives.

As a mounting board 2, the printed circuit board to which the surface mount of the electronic products was carried out is used.

The thermoplastic adhesives 5 are beforehand applied to the mounting board 2 so that it may stick to the ejected liquid crystal resin 3 well.

As thermoplastic adhesives 5, what has the elasticity of urethane resin etc. is desirable.

This is for preventing that external stress is being direct on the electronic products of the completed integrated circuit card, in order that the liquid crystal resin 3 which melted at the time of ejection fabrication may ease thermal pressure exerted on electronic products.

Next, the above-mentioned mounting board 2 is installed in one side of a metallic mold 1.

What is necessary is to stand the pin for positioning to a metallic

c mold 1, or just to fix to a metallic mold 1 by vacuum suction as the method.

Moreover, where the mounting board 2 is fixed to the carrier film which has separability, you may install (refer to the 4th figure).

Liquid crystal resin 3 is ejected following the model bundle of a metallic mold 1.

As liquid crystal resin 3, a coefficient of linear expansion is as the orientation direction 1, less than $[5 \times 10^{-5} / \text{degree C}]$, and follows $[\text{direct orientation direction } 8.5 \times 10^{-5} / \text{degree C}]$, and is as what waits for the order of minus in the orientation direction desirably, for example, less than $[\text{orientation direction } -1.0 \times 10^{-5} / \text{degree C}]$, and follows $[\text{direct orientation direction } 6.0 \times 10^{-5} / \text{degree C}]$.

I hear that that a coefficient of linear expansion is small has the small contraction after carrying out ejection fabrication, and there is, that whose coefficient of linear expansion is minus expands after ejection fabrication conversely, and prop power commits it to a mounting board.

That is, since electronic products are carried only in one side of the mounting-on character board of an integrated circuit card, the stress which makes a mounting side recess arises and this power is set off against the prop power of the ejected liquid crystal resin 3.

The heat modification temperature of liquid crystal resin 3 has a desirable thing 150 degrees C or less.

This is because there is little influence which it has on electronic products at the time of ejection fabrication since low-temperature fabrication is comparatively possible for a thing 150 degrees C or less and heat modification temperature is high mobility.

There are some which made basic structure the copolymer of p-hydroxy benzoic acid and a polyethylene tele lid rate, and made basic structure the copolymer of the thing and p-hydroxy benzoic acid which made basic structure the copolymer of the thing and p-hydroxy benzoic acid the mol ratio of whose is 40:60-70:30, and 2-hydroxy-6-carboxyl naphthalene, 4 and 4'-dihydroxybiphenyl, and tetephthalic acid as liquid crystal resin 3 which fulfills such conditions. Moreover, a filler and glass fiber may be mixed by liquid crystal resin 3.

If ejection fabrication of such liquid crystal resin 3 is carried out into a metallic mold 1, it fills up taking multilayer structure within a metallic mold 1, and cooling solidification will be carried out, with the structure maintained, and liquid crystal resin 3 will serve as the card machine material 4.

The card machine material 4 unites with the mounting board 2, and serves as an integrated circuit card which was rich in elasticity and was excellent in opposite shock nature.

Furthermore, you may stick the lamination film 26 for makeup on bo

th sides of an integrated circuit card if needed (refer to the 5th figure).

Thus, an integrated circuit card with high reliability strong against external stress is obtained by using liquid crystal resin 3. Moreover, insulated destructive intensity is reliable as an integrated circuit card also from about 20 kv(s)/mm and a large thing.

[Case of the operation]

Electronic products carried out coating of the adhesives of an urethane resin system beforehand and installed this mounting board in one side of a metallic mold to the printed circuit board by which the surface mount was carried out continuously.

In order to position a mounting board to a metallic mold, the pin for not causing position gap by resin pressure at the time of fabrication was prepared.

moreover, curl which generated electronic products at the time of processing of carrying out a surface mount is corrected, and adhesion installation can be carried out completely at a metallic mold -- as -- vacuum suction -- the hole was prepared

After carrying out adhesion installation of the mounting board by vacuum suction, the metallic mold was closed, liquid crystal resin was ejected on condition that the following, and card machine material was formed.

the ejection fabrication machine 6-oz nozzle temperature of 240 degrees C -- a metallic mold -- the 30% ejection pressure of 250kg/cm² liquid-crystal resin of temperature ejection speed of 40 degrees C makes basic structure p-hydroxy benzoic acid and a polyethylene tele lid rate, and what has the following characteristics was used for it

It bends the coefficient-of-linear-expansion orientation direction 0.05x10⁻⁵/degree-C direct direction 0.40x10⁻⁵/degree-C heat modification temperature insulation [of 64 degrees C] destructive intensity of 19.0kv/mm, and is rate of elasticity 95000 kg/cm spiral flow 70mm.

(240 degree C of resin temperature, extrusion pressure 200 kg/cm², 40 degree C of mold temperature)

the electromagnetism which opens a metallic mold after cooling solidification, takes out a cast, sticks the label ornamented by the front back of a cast, and does not have a contact terminal -- the guided type integrated circuit card was obtained

Since this integrated circuit card was sealing the mounting board in which electronic products were carried by carrying out ejection

fabrication of the liquid crystal resin, it was what does not have breakage of electronic products and does not have curl. Moreover, it excelled also in airtightness and the electrical property and reliability strong also against external stress was high.

[The effect of invention]

Curl does not produce this invention, without damaging electronic products by thermal pressure at the time of fabrication, since the liquid crystal resin with the low rate of contraction in which the low-temperature fabrication with high mobility is possible is used as card machine material in an integrated circuit card. Moreover, it excels also in airtightness and an electrical property and is an integrated circuit card with high reliability strong also against external stress. Moreover, the manufacture method is also easy.

4. Easy explanation of the drawings

Figure 1st [the], 2, and 4 of a drawing is a sectional view showing one case of the operation of the manufacture method of the integrated circuit card of this invention.

Fig. 3rd [the] and 5 is a sectional view showing one case of the operation of the integrated circuit card manufactured by this invention.

Fig. 6-8 is a sectional view showing one case of the operation of the manufacture method of the conventional integrated circuit card

1 [-- Liquid crystal resin, 4 / -- Card machine material, 5 / -- Thermoplastic adhesives.] -- A metallic mold, 2 -- A mounting board, 3